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EXAMINER	
LEVITAN, DMITRY	

ART UNIT	PAPER NUMBER
2662	

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/540,730	EBERLE ET AL.	
	Examiner	Art Unit	
	Dmitry Levitan	2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19 and 21-30* is/are rejected.

7)☒ Claim(s) *20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *02/11/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Amendment, filed 02/11/05, has been entered. Claims 1-30 remain pending.

Specification

1. In light of Applicant's amendment the objection to the specification has been withdrawn.

Claim Rejections - 35 USC § 112

2. In light of Applicant's amendment the claim rejection under 35 U.S.C. 112, second paragraph has been withdrawn

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 7, 8, 11, 14, 16, 18, 25-27, 29 and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Cloonan (US 5,550,815).

5. Regarding claims 1, 14, 18 and 30, Cloonan teaches a method and a system for communicating packets between sending and receiving nodes of a switched network (nodes are inherently connected to inputs and outputs of the packet switch 100 on Fig. 1, because the switch is connected to a packet network 2:3-10), the switch network including a buffer-less switch coupling the sending nodes and the receiving nodes (memory less distribution network 102 on Fig. 1 and 1:60-65), comprising:

Transmitting packets from sending nodes to the input ports of the buffer-less switch (transmitting cells using knockout principle 2:43-55); and

Forwarding all packets that are successfully delivered through output ports of the buffer-less switch to the receiving nodes, through the buffer-less switch with a fixed forwarding rate (Examiner interprets fixed forwarding rate as the fixed propagation delay from the switch input to the appropriate output of the switch. Switch 100 with memory less distribution network 102, small and predictable delay in the elastic store 107 and use of the knockout principle in the output module 104 delivers the cells through the switch with fixed forwarding rate 3:46-67 and 4:1-5).

In addition, regarding claims 14 and 30, Cloonan teaches two packets (cells) competing for the switch resource, selecting one and dropping the loser (knockout principle 2:50-55).

6. Regarding claims 7 and 8, Cloonan teaches for each packet sent over the switched network, requesting path allocation with respect to arrival time in the buffer less switch (extracting VPI/VCI information from the cells headers and requesting controller 112 to hunt for paths 3:45-55),

the first requester requesting the one transmission path and ignoring other requests until the path become available (controller 112 calculating and storing the current information regarding transmission paths, indicating its state busy or idle for other requests 3:55-60); and

if multiple requests collide by requesting a switch resource simultaneously, selecting a first packet as winner and dropping the other request (utilizing knockout principle 2:50-55).

7. Regarding claim 11, Cloonan teaches allocating resources, including paths and output ports, based on the header of the received cell, so no buffer space in the receiving node can be

allocated before the cell is sent, because the destination of the cell is derived from its header (3:45-55).

8. Regarding claim 16, Cloonan teaches transmitting low latency packets (inherently part of the system, because Cloonan teaches designing the switch to satisfy packet delay characteristics 1:30-35).

9. Regarding claims 25-27, Cloonan teaches a plurality of input registers coupled to the respective input ports (elastic stores 107 in plurality of interfaces 106 as on Fig. 1 and 1:50-58); Switch control logic (controller 112 on Fig. 1), coupled to the input registers and responsible to allocate output ports on the switch according to the packet information (hunt paths according to the cell VPI/VCI 3:46-55);

Wherein the control logic is allocating output ports on first come first serve basis (controller 112 allocates the port to the first request and mark it busy for the next request 3:55-64).

In addition regarding claim 26, Cloonan teaches if first and second requests for the output port collide, selecting a winner and dropping a loser (utilizing knockout principle 2:50-55).

Regarding claim 27 (as best understood), Cloonan teaches output registers to receive data selected by respective selector circuit (FIFOs 110, receiving data selected by controller 112 on Fig. 1 and 2:19-25).

10. Regarding claim 29, Cloonan teaches a plurality of cascaded buffer-less switches, forming a multistage buffer-less switch (multi stage memory-less distribution network 102 4:35-51).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 2, 3, 6, 9, 10, 15, 17 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cloonan in view of Lea (US 6,115,373).

13. Regarding claims 2, 6 and 17, Cloonan teaches all the limitations of the parent claim 1. Cloonan does not teach each receiving node sending an ACK to a sending node at a predetermined time to indicate successful delivery/transmission of a packet.

Lea teaches each receiving node sending an ACK to a sending node at a predetermined time to sending a corresponding packet to indicate successful delivery/transmission of a packet (sending ACK from destination to the source, inherently at a predetermined time, because the ACK indicating the successful packet transmission should be received at the source to resume the transmission 5:50-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add each receiving node sending an ACK to a sending node at a predetermined time to indicate successful delivery/transmission of a packet of Lea to the system of Cloonan to ensure transmission reliability, by indicating errored packets during transmission.

Regarding claim 3, Lea teaches indicating unsuccessful packet transmission if the ACK was not returned after the predetermined time has elapsed (absence of ACK, inherently after the

predetermined time has elapsed, because Lea teaches the importance of receiving the ACK in shortest possible time 5:56-62).

14. Regarding claims 9, 10, 15 and 28, Cloonan teaches all the limitations of the parent's claims.

Cloonan does not teach selecting a winning packet randomly and according to fairness criteria to allocate to each input port an equal share of bandwidth at each output port.

Lea teaches selecting a winning packet randomly (random choice of one of two inputs/packets 5:31-42) and according to fairness criteria to allocate to each input port an equal share of bandwidth at each output port (evenly distributing traffic 7:46-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add selecting a winning packet randomly and according to a fairness criteria to allocate to each input port an equal share of bandwidth at each output port of Lea to the system of Cloonan to improve the system quality of transmission, by increasing the transmission speed by dropping competing packets and evenly spreading the load in a switch to address all the switch inputs in a fair way.

15. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cloonan in view of Lee (US 5,821,875).

Cloonan teaches all the limitations of the parent claim 18.

Cloonan does not teach comprising a second switched network coupled to the plurality of sending and receiving nodes.

Lee teaches comprising a second switched network coupled to the plurality of sending and receiving nodes (circuit switched 210a and 210b on Fig. 5 and 5:16-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a second switched network coupled to the plurality of sending and receiving nodes of Lee to the system of Cloonan to improve the system reliability in case of the first switched network failure.

16. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cloonan and Lea.

Cloonan and Lea teach all the limitations of claims 1-3.

Cloonan and Lea do not teach receiving node sends a NACK at the predetermined time to the sending node on detection of an error in the received packet checksum.

Official notice is taken that receiving node sends a NACK at the predetermined time to the sending node on detection of an error in the received packet checksum is well known in the art to indicate an error in the received packet and often retransmit the packet.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add receiving node sends a NACK at the predetermined time to the sending node on detection of an error in the received packet checksum to the system of Cloonan and Lea to improve the system quality of transmission.

17. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cloonan.

Cloonan teaches all the limitations of claims 1, 7 and 11.

Cloonan does not teach receiving node sends a NACK to the sending node on detection of a buffer overflow.

Official notice is taken that receiving node sends a NACK to the sending node on detection of a buffer overflow is well known in the art to indicate a problem at the receive side and often requires the source to reduce the transmission rate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add receiving node sends a NACK to the sending node on detection of a buffer overflow to the system of Cloonan to improve the system quality of transmission.

18. Claims 13, 21, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cloonan in view of Busch (US 3,676,846).

Cloonan teaches all the limitations of parent claims 1 and 18.

Cloonan does not teach sending register polling the status register to determine the success of the packet transmission and rewrite the packet into the send register if the transmission of the packet failed.

Busch teaches sending register polling the status register to determine the success of the packet transmission and rewrite the packet into the send register if the transmission of the packet failed (sending computer 119 transmitting block of data to the central computer123 as shown on Fig. 1, sending computer polling the status register, inherently part of the system, because Busch teaches storing acknowledgements for the transmitted data blocks 3:65-75 and rewriting the data for retransmission in the send register 523 on Fig. 5 and 14:15-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add sending register polling the status register to determine the success of the packet transmission and rewrite the packet into the send register if the transmission of the packet failed

of Busch to the system of Cloonan to improve the system quality of transmission by retransmitting the errored packets.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cloonan and Busch.

Cloonan and Busch substantially teach all the limitations of the parent claims.

Cloonan and Busch do not teach sending an NACK indicating a type of failure and saving it.

Official notice is taken that sending an NACK indicating a type of failure and saving it is well known in the art to help the operator to determine the cause of the transmission problem.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add sending an NACK indicating a type of failure and saving it to the system of Cloonan and Busch to improve the system indication of the source causing transmitted packet failure.

Response to Arguments

19. Applicant's arguments filed 02/11/05 have been fully considered but they are not persuasive.

On page 10 of the Response, Applicant argues that Cloonan does not teach buffer-less switch because the packet switch 100 contains output buffers/FIFOs.

Examiner respectfully disagrees.

Applicant specifies the term "buffer-less" switch as the switch that "provides no buffers for temporarily storing packets or portion of packets in case there are conflicts during a transfer for a particular switch resource" on 18:11-15 and explains further that "being buffer-less does not imply that there can be no storage elements that are present do not provide buffering resulting in a variable transmission delays through the switch" on 19:17-20.

In the light of the above quotations, Cloonan switch is buffer-less switch, because the output buffers/FIFOs of the switch do not serve to resolve the packets conflicts, resolved by the knockout principle in the system, and do not produce variable transmission delays.

On pages 10 and 11 of the Response, Applicant argues that Cloonan does not teach fixed forwarding rate in his switch.

Examiner respectfully disagrees.

In light of Applicant's remarks on page 8, "the forwarding rate of packet transmission through the buffer-less switch is fixed", Cloonan teaches fixed forwarding rate in his buffer-less switch.

Examiner believes that Applicant's arguments regarding the FIFO size of Cloonan are irrelevant, as the FIFOs present small non-variable delays in the buffer-less switch of Cloonan.

On pages 11-13 of the Response, Applicant argues that Cloonan does not teach operating with low latency packets/network.

Examiner respectfully disagrees.

Cloonan teaches a switch utilizing well-known knockout principal, wherein the reduction of the packets delays in the switch is a paramount. Therefore Cloonan buffer-less switch inherently operates with low latency packets/networks, because the use of the knockout principle makes sense only when the packets/networks low latency is important.

On pages 14 and 15 of the Response, Applicant argues that Lea does not teach positively determine packets after a fixed delay.

Examiner respectfully disagrees.

Lea teaches sending an ACK to indicate successful delivery/transmission of a packet and inherently at a predetermined time, because the systems utilizing ACK messages to resume transmission after the positive acknowledgment/ACK of the transmitted portion, need to get the ACK message in predetermined time to resume transmission.

On page 16 of the Response, Applicant requested the evidence to support the Official notice taken in the claim 12.

Ito (US 5,539,747) teaches the receiving node sending NACK to the sending node on detection of a buffer overflow to reduce the transmission rate (network device 110 on Fig.1 generates a reset cell, based on danger of buffer 116 overflow, send to user devices 102-105 to reduce the transmission rate 7:36-67 and 8:1-59).

The Official Notice, presented in the last Office action, concerning the buffer overflow prevention is maintained.

On page 16 of the Response, Applicant requested the evidence to support the Official notice taken in the claim 23.

Butler (US 4,654,654) teaches the receiving node sending NACK to the sending node on indicating type of failure and saving it (sending NACK 10:44-54 including type of failure indication 11:47-55, and storing it at the reception side 12:45-65).

The Official Notice, presented in the last Office action, concerning the NACK indicating the type of failure is maintained.

On page 16 of the Response, Applicant argues that sending computer polling the status register is not inherently part of the system of Busch.

Examiner respectfully disagrees.

Busch teaches interrogating/polling the status of various devices, including the status of register 203 (9:7-34), operating as a status register, because it combines the information from two registers 205 and 209 (8:53-57).

Regarding claims 24 and 28, Applicant's presumption of similar rejection of claim 9 and 28 is correct.

The typographical error of omitting claims 24 and 28 from the rejections of respective claims 9 and 13 has been corrected.

Examiner therefore believes that the cited references meet all the claims limitations and the rejection is proper.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Levitan whose telephone number is (571) 272-3093. The examiner can normally be reached on 8:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DL

Dmitry Levitan
Patent Examiner.
04/21/05

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